

## Stopper cylinders EFSD

**FESTO**



## Key features

### At a glance

- Quick and easy to install on transfer systems
- No valves, tubing or compressed air required
- Low noise pollution
- Three sizes for stopping conveyed goods weighing between 0.25 kg and 100 kg

#### LED indicator

Status and error messages for visual error diagnostics

#### Cushioning module

with adjustable cushioning



#### Actuation via digital I/O

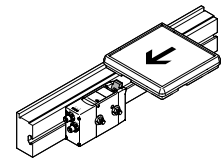
makes commissioning easier

#### Integrated sensors

for position sensing  
(stop retracted or extended)

#### Mounting interface

for easy mounting on transfer systems



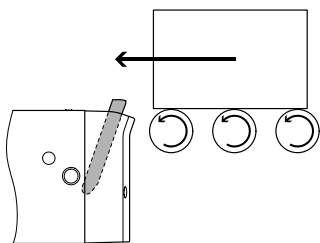
### Electrical actuation

- No separate controller required
- Direct connection to digital I/O of a higher-order controller, e.g. terminal CPX
- 24 V DC motor with low power demand
- Saves energy – 24 V DC motor with low power demand
- Type of connection: 2x M12 plug (5-pin) for drive and position sensing
- Sensing of upper and lower position of the stop (extended or retracted) using integrated Hall effect sensors

### Adjustable cushioning

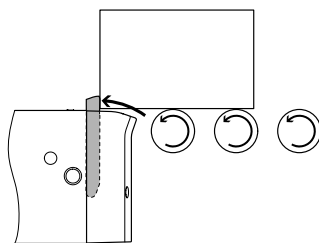
- Cushioning force can be adjusted to different loads
- One size in the transfer system for empty and full workpiece carriers
- Easy to adjust the cushioning using setting screw on the top of the device
- Low-maintenance cushioning (atmospheric air)

### Functional sequence



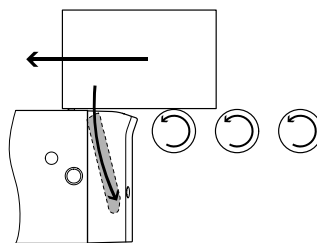
#### Position 1 Stopper cylinder is in the initial position

The stop is extended and ready to stop a conveyed item  
LED status message: closed  
Input signal: 0



#### Position 2 Stopper cylinder is in the holding position

The conveyed item is stopped by internal cushioning and then held in position  
LED status message: closed  
Input signal: 0



#### Position 3 Stopper cylinder is in the release position

The stop is retracted and the conveyed item is released  
LED status message: open  
Input signal: 1

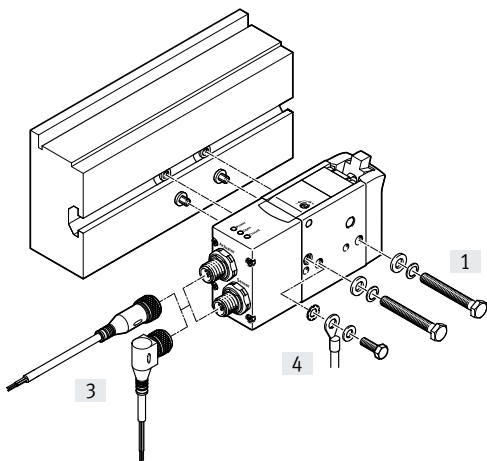
### Type codes and peripherals overview

<b>001</b>	<b>Series</b>	
<b>EFSD</b>	Stopper cylinder	
<b>002</b>	<b>Size</b>	
<b>20</b>	20	
<b>50</b>	50	
<b>100</b>	100	

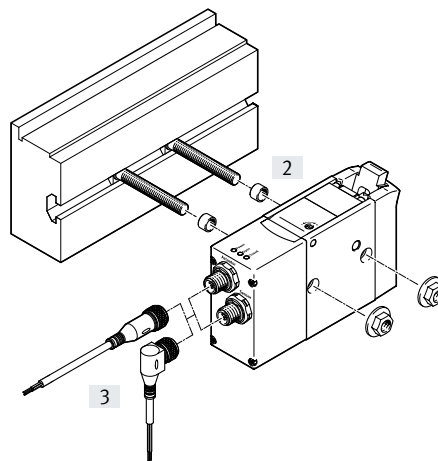
<b>003</b>	<b>Cushioning</b>	
<b>PV</b>	Pneumatic cushioning, adjustable	
<b>004</b>	<b>Electrical connection</b>	
<b>M12</b>	Serial interface M12	

### Peripherals overview

EFSD-20



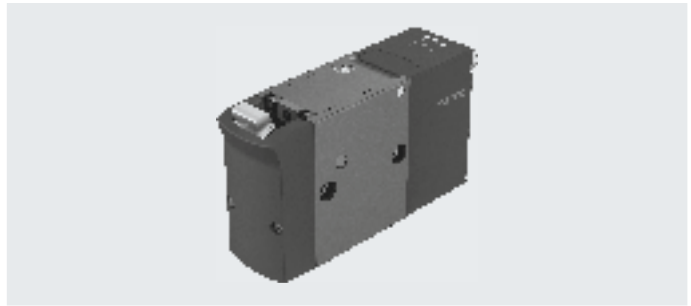
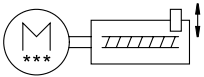
EFSD-50/100



### Accessories

	Description	→ Page/Internet
[1] Mounting kit EAHM-E18-K-20	For mounting on a profile with slot 8	3
[2] Mounting kit EAHM-E18-K-50	For mounting on a profile with slot 10 and web width of approx. 6 mm	8
Mounting kit EAHM-E18-K-50-Z65	For mounting on a profile with slot 10 and web width of approx. 3.7 mm	8
[3] Connecting cable NEBU	For connection to a controller	9
[4] Earthing kit	For size 20, electrostatic influences may cause malfunctions. Therefore, an earthing kit is included in the scope of delivery of the stopper cylinder	-

Data sheet



General technical data				
Size		20	50	100
Design		Electric stopper cylinder		
Ready status indication		LED		
Cushioning length	[mm]	11.5	17.5	18.2
Retracting/extending time				
Max. time for retracting <sup>1)</sup>	[s]	0.1	0.15	0.3
Max. time for extending	[s]	0.1	0.15	0.2
Position sensing		Via integrated Hall effect sensor		
Type of mounting		Via mounting kit		
Mounting position		Any		
Product weight	[g]	420	800	985

1) Without transverse load

Electrical data				
Size		20	50	100
Motor type		Stepper motor		
Power supply	[V DC]	24 ±15%		
Max. current consumption <sup>1)</sup>				
Actuator	[A]	1.9	1.2	1.4
Sensor	[A]	0.3		
Max. switching frequency	[Hz]	0.33		
Max. line length	[m]	30		
Electrical connection, actuator, sensor				
Connection type		Plug		
Connection technology		M12x1, A-coded to EN 61076-2-101		
Number of pins/wires		5		

1) During the switch-on process, there is briefly a larger starting current.

Operating and environmental conditions				
Ambient temperature	[°C]	-10 ... +60		
Storage temperature	[°C]	-20 ... +60		
Relative humidity		0 ... 95% (non-condensing)		
Degree of protection		IP40		
Corrosion resistance CRC <sup>1)</sup>		1 – Low corrosion stress		
KC marking		KC EMC		
CE marking (see declaration of conformity) <sup>2)</sup>		To EU-EMC Directive		
UKCA marking (see declaration of conformity) <sup>2)</sup>		To UK instructions for EMC		

1) Additional information [www.festo.com/x/topic/kbk](http://www.festo.com/x/topic/kbk)

2) Additional information [www.festo.com/catalogue/...](http://www.festo.com/catalogue/...) → Support/Downloads

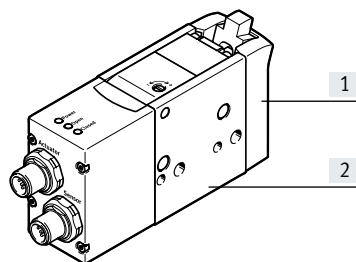
## Data sheet

Maximum load to be stopped at conveying speed $v_f$				
Size		20	50	100
Conveying speed $v_f$				
6 m/min	[kg]	0.25 ... 20	1 ... 50	3 ... 100
9 m/min	[kg]	0.25 ... 10	1 ... 35	3 ... 70
12 m/min	[kg]	0.25 ... 7	1 ... 30	3 ... 60
18 m/min	[kg]	0.25 ... 3.5	1 ... 18	3 ... 50
24 m/min	[kg]	0.25 ... 2.5	1 ... 12	3 ... 45
30 m/min	[kg]	0.25 ... 2	1 ... 8	3 ... 30
36 m/min	[kg]	0.25 ... 1	1 ... 5	3 ... 20
For friction coefficient $\mu^1$		0.1	0.1	0.07

- 1) For size 20/50: between conveyed goods and belt system  
For size 100: between conveyed goods and roller system

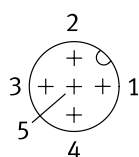
Max. transverse load F during switching operation				
Size		20	50	100
Transverse load	[N]	20	50	100

## Materials



Stopper cylinder	
[1] Cover	PA reinforced
[2] Housing	Hard anodised wrought aluminium alloy
- Piston rod	High-alloy stainless steel
Screws	Coated steel
Seals	NBR
Note on materials	RoHS-compliant
PWIS conformity	VDMA24364 zone III

## Pin allocation of the connector plug



M12 plug (5-pin, A-coded)		
Pin	Actuator connection	Sensor connection
1 brown (BN)	Not assigned	Supply voltage +24 V DC
2 white (WH)	Input	Output 1 (open)
3 blue (BU)	0 V	0 V
4 black (BK)	Supply voltage +24 V DC	Output 2 (closed)
5 grey (GY)	Functional earth (FE) <sup>1)</sup>	Functional earth (FE) <sup>1)</sup>

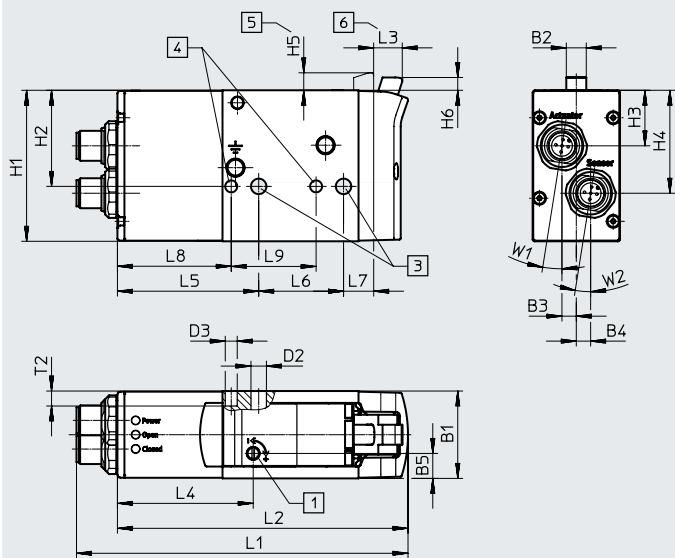
- 1) Functional earth must always be connected.

Data sheet

**Dimensions**

Download CAD data → [www.festo.com](http://www.festo.com)

EFSD-20-PV-M12



- [1] Cushioning adjustment
- [3] Drilled hole for retaining screw
- [4] Drilled hole for centring pins
- [5] Return stroke min. dimension H5
- [6] Cushioning stroke

Size	B1	B2	B3	B4	B5	D2 ∅	D3 ∅	H1	H2	H3	H4	H5
	±0.05		±0.4	±0.4	±0.25	+0.1/-0.05	±0.05		±0.15	±0.5	±0.5	±0.55
20	35	8	5.75	5.75	7.5	6.2	4.8	60.5	38.5	22.25	41.25	7

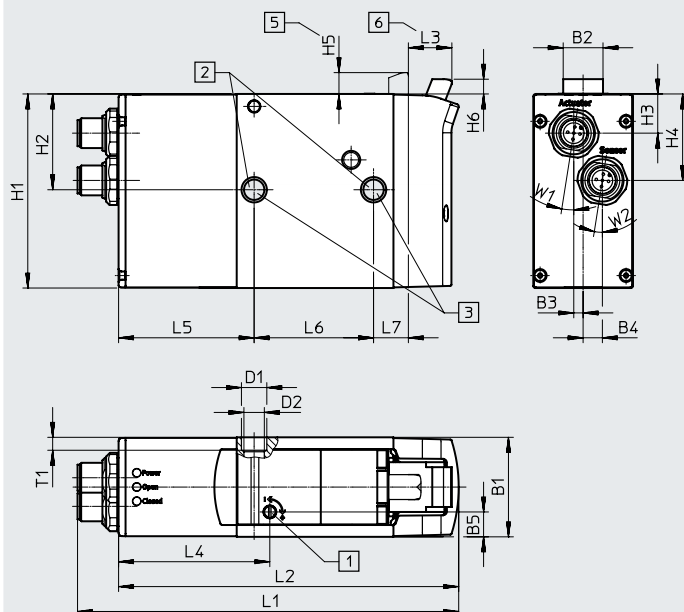
Size	H6	L1	L2	L3	L4	L5	L6	L7	L8	L9	T2	W1	W2
	±0.55	±1	±0.5	+0.5/-1	±0.5		±0.1	±0.5		±0.1	±0.2		
20	5.1	132.8	116.4	11.5	54.4	56.6	34	12	45.6	34	6	9°	9°

Data sheet

Dimensions

Download CAD data → [www.festo.com](http://www.festo.com)

EFSD-50/100-PV-M12

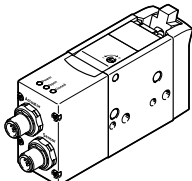


- [1] Cushioning adjustment
- [2] Drilled hole for centring sleeve
- [3] Drilled hole for retaining screw
- [5] Return stroke min. dimension H5
- [6] Cushioning stroke

Size	B1	B2	B3	B4	B5	D1	D2	H1	H2	H3	H4	H5
	±0.05		±0.4	±0.4	±0.25	∅ +0.07/-0.05	∅ +0.1/-0.05		±0.15	±0.5	±0.5	±0.55
50	40	16	3.75	7.75	10	10.2	8.2	78	38.5	15.75	34.75	8.6
100	44	16	5.4	8.7	11.5	10.2	8.2	78	38.5	14	29.4	8.6

Size	H6	L1	L2	L3	L4	L5	L6	L7	T1	W1	W2
	±0.55	±1.1	±0.5	+0.5/-1	±0.5		±0.1		+0.1/-0.05		
50	6	153.2	136.7	17.5	60.8	54.5	48	14 ±0.5	5.2	9°	9°
100	6.3	163.7	147.2	18.2	67.3	58	52	13.8 ±0.6	5.2	9°	9°

Ordering data

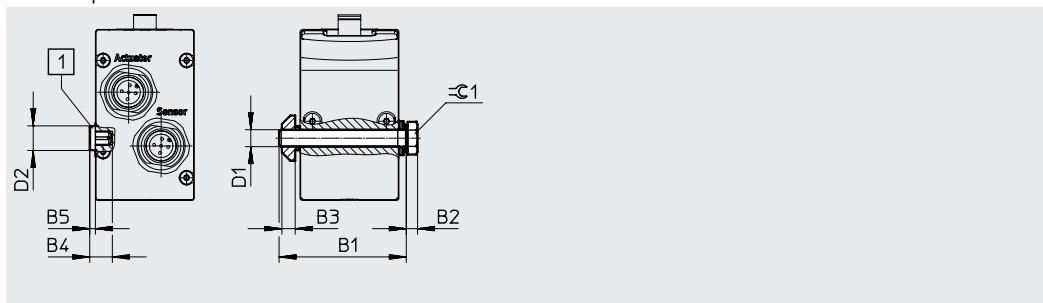
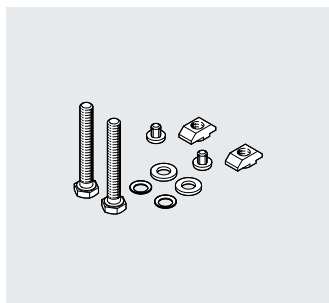
	Size	Part no.	Type
	20	2942445	EFSD-20-PV-M12
	50	2942446	EFSD-50-PV-M12
	100	2942447	EFSD-100-PV-M12

Accessories

**Mounting kit  
EAHM-E18-K-20**

For mounting on a profile with slot 8

Material:  
Slot nuts, screws: galvanised steel  
Centring pins: plastic  
Contains paint-wetting impairment substances  
RoHS-compliant

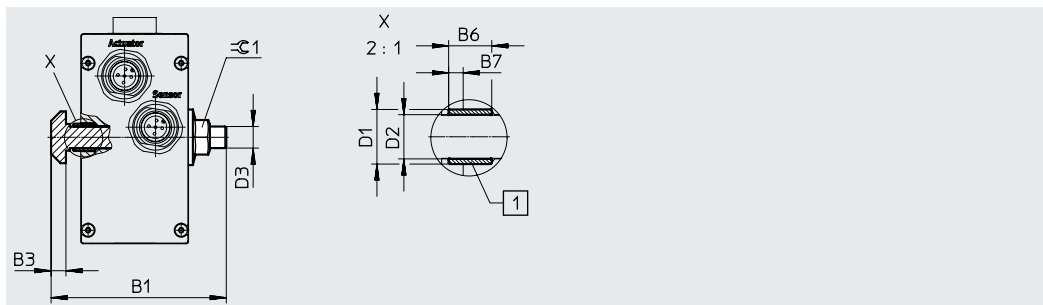
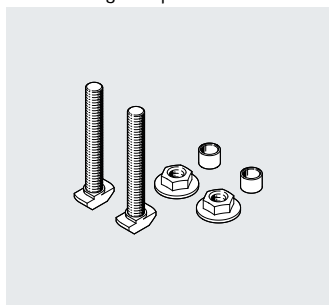


Dimensions and ordering data											
For size	B1	B2	B3	B4	B5	D1	D2 ∅	±1	Weight	Part no.	Type
	+1								[g]		
20	45	4	4.7	7.5	2	M6	8.5	10	34	8058454	EAHM-E18-K-20

**Mounting kit  
EAHM-E18-K-50-Z65  
EAHM-E18-K-50**

For mounting on a profile with slot 10

Material:  
Galvanised steel  
Contains paint-wetting impairment substances  
RoHS-compliant

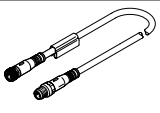
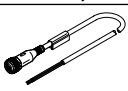
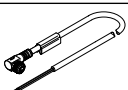


Dimensions and ordering data											
For size	B1	B3	B6	B7	D1 ∅	D2 ∅	D3	±1	Weight	Part no.	Type
	+1		-0.1		-0.02	+0.1			[g]		
50, 100 <sup>1)</sup>	65	5.5	6.5	1.2	10.1	8.2	M8	13	85	8058455	EAHM-E18-K-50-Z65
50, 100 <sup>2)</sup>	65	5.5	8	2.7	10.1	8.2	M8	13	85	8058456	EAHM-E18-K-50

1) For a profile with web width of approx. 3.7 mm  
2) For a profile with web width of approx. 6 mm



## Accessories

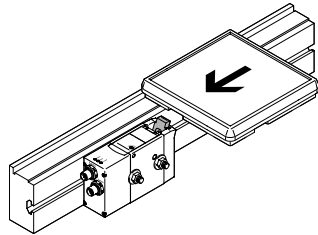
Ordering data – Connecting cable NEBU-M12					
	Outlet direction	Cable characteristic	Cable length [m]	Part no.	Type
<b>Socket, 5-pin, M12 – plug, 5-pin, M12</b>					
	Straight – angled	Standard	0.5	8003617	NEBU-M12G5-K-0.5-M12W5
	Straight – angled		2	8003618	NEBU-M12G5-K-2-M12W5
	Angled – angled		0.5	570733	NEBU-M12W5-K-0.5-M12W5
	Angled – angled		2	570734	NEBU-M12W5-K-2-M12W5
	Straight – angled	Suitable for energy chains	5	574321	NEBU-M12G5-E-5-Q8N-M12G5
			7.5	574322	NEBU-M12G5-E-7.5-Q8N-M12G5
			10	574323	NEBU-M12G5-E-10-Q8N-M12G5
<b>Socket, 5-pin, M12 – open cable end, 5-wire</b>					
	Straight	Standard	2.5	541330	NEBU-M12G5-K-2.5-LE5
			5	541331	NEBU-M12G5-K-5-LE5
			10	554038	NEBU-M12G5-K-10-LE5
	Angled		2.5	567843	NEBU-M12W5-K-2.5-LE5
			5	567844	NEBU-M12W5-K-5-LE5

## Data sheet

### Selection aid

#### Stopping conveyed goods

The stopper cylinder is used to brake a conveyed item.



### Example

Given:

Friction coefficient  $\mu = 0.1$

Conveying speed  $v = 12 \text{ m/min}$

Conveyed goods  $m$  with workpiece carrier = 25 kg

Selection: stopper cylinder EFSD-50

### 1. Checking the permissible load

At a conveying speed of 12 m/min, the maximum permissible load is 30 kg (page 5, table at top).

Result:

This means that the total load of 25 kg for the conveyed goods is permissible.

Maximum load to be stopped at conveying speed $v_f$				
Size		20	50	100
Conveying speed $v_f$				
6 m/min	[kg]	0.25 ... 20	1 ... 50	3 ... 100
9 m/min	[kg]	0.25 ... 10	1 ... 35	3 ... 70
12 m/min	[kg]	0.25 ... 7	1 ... 30	3 ... 60
18 m/min	[kg]	0.25 ... 3.5	1 ... 18	3 ... 50
24 m/min	[kg]	0.25 ... 2.5	1 ... 12	3 ... 45
30 m/min	[kg]	0.25 ... 2	1 ... 8	3 ... 30
36 m/min	[kg]	0.25 ... 1	1 ... 5	3 ... 20
For friction coefficient $\mu^{1)}$		0.1	0.1	0.07

1) For size 2 0/50: between conveyed goods and belt system  
For size 100: between conveyed goods and roller system

### 2. Checking the permissible transverse load

In the case of EFSD50, the maximum transverse load is 50 N (page 5, table at top).

Max. transverse load $F$ during switching operation				
Size		20	50	100
Transverse load	[N]	20	50	100

Transverse load  $F_q =$

friction force  $F_{\text{Friction}}$

$$F_{\text{Friction}} = \mu \times m \times g$$

$$= 0.1 \times 25 \text{ kg} \times 9.81 \text{ m/s}^2$$

$$= \text{approx. } 25 \text{ N}$$

Result:

This means that a transverse load of 25 N is permissible.